

Science Field Review October 2 – December 1, 2006

Functional Independence, Supported Independence, and Participation (FI/SI/P)

Extended Benchmarks (EB)

Background Information: The federal No Child Left Behind Act of 2001 mandated the existence of a set of comprehensive state assessments that are designed and based on rigorous content. The MI-Access Science Assessment Plan Writing Team (APWT) extended the Michigan Curriculum Framework's Science Content Benchmarks, 2000 version (MCF v.2000) for the Functional Independence, Supported Independence, and Participation (FI/SI/P) student populations during the 2005-2006 school year. The draft Extended Benchmarks (EB) require field review in order to ensure they are appropriate for each population.

Instructions: Please complete the online survey for the MI-Access FI/SI/P EB in order to provide the Michigan Department of Education your feedback. The survey is located at www.mi.gov/mi-access in the "Survey Information" category.

SCIENCE USING PHYSICAL SCIENCE KNOWLEDGE

Extended Benchmarks MI-Access Functional Independence, Supported Independence, and Participation

The science benchmarks in this document are taken from the Michigan Curriculum Framework Science Content Benchmarks, 2000 version (MCF v.2000). These benchmarks have been extended for the MI-Access Functional Independence, Supported Independence, and Participation populations, and are presented in this document. The coding key below explains abbreviations found in this document, including the benchmark and extended benchmark codes.

Table of Contents and Coding Key

Content Area: Science (S)	
Level of Independence:	
Full Independence: These students would most likely participate in the Mi	chigan Educational
Assessment Program (MEAP) assessments with or without accommodation	ns.
MI-Access Population:	
Functional Independence (FI)	
Supported Independence (SI)	
Participation (PA)	
Strand: Using Physical Science Knowledge (P) [In MCF v.2000: IV]	
Standard:	
Matter and Energy (ME) [In MCF v.2000: PME-IV.1]	3
Changes in Matter (CM) [In MCF v.2000: PCM-IV.2]	19
Motion of Objects (MO) [In MCF v.2000: PMO-IV.3]	
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Grade Level:
     Elementary (e)
     Middle School (m)
     High School (h)
Extended Benchmark
     EB01, EB02, etc. [In MCF v.2000, Benchmark: 1, 2, etc.]
n/a = Not applicable
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SCIENCE STRAND: MATTER AND ENERGY (ME)				
Ticusure and describe the	timigs around us.			
Level of Independence (Full, FI, SI, PA) and Assessable at: (Classroom/ LEA/ISD, State) Grade Level				
Elementary School	Middle School	High School		
V.1.e.1 Classify common objects and substances according to observable attributes/properties. Key concepts: Texture—rough, smooth. Flexibility—rigid, stiff, irm, flexible, strong. Hardness.	IV.1.m.1 Describe and compare objects in terms of mass, volume, and density. Key concepts: Units of density—grams per cubic centimeter or grams per milliliter.	Analyze properties of common household and agricultural materials in terms of risk/benefit balance. Key concepts: Risk/benefit analysis.		
\Cl	Elementary School V.1.e.1 lassify common objects and libstances according to observable attributes/properties. ey concepts: Texture—rough, mooth. Flexibility—rigid, stiff,	Elementary School Middle School V.1.e.1 lassify common objects and abstances according to observable attributes/properties. Ley concepts: Texture—rough, mooth. Flexibility—rigid, stiff, mooth. Flexibile, strong. Hardness. Middle School IV.1.m.1 Describe and compare objects in terms of mass, volume, and density. Key concepts: Units of density—grams per cubic centimeter or grams per milliliter.		

Measurement tools: Balance,

measuring cup or graduated

m.4 (making measurements).

Real-world contexts: Common

objects and substances.

cylinder, metric ruler. See C-I.1

Real-world contexts: Herbicides,

refrigerants, fertilizers,

detergents.

9-1-06

States of matter—solid, liquid,

attract, repel, push, pull. Size-

width, height (3-5). Sink, float. Color—common color words.

Shape—circle, square, triangle,

rectangle, oval. Weight—heavy, light, heavier, lighter. See PWV-IV.4.e.4 (shadows: objects that let light pass through or block light); PME-IV.1 e.2 (materials that conduct electricity); C-I.1 e.4 (use measuring devices).

gas. Magnetic properties—

larger, smaller (K-2); length,

	T		
	Real-world contexts: Common		
	objects, such as desks, coins,		
	pencils, buildings, snowflakes;		
	common substances, including—		
	solids, such as copper, iron,		
	wood, plastic, Styrofoam;		
	liquids, such as water, alcohol,		
	milk, juice; gases such as air,		
	helium, water vapor.		
Draft Functional	S.FI.P.ME.e.EB01	S.FI.P.ME.m.EB01	S.FI.P.ME.h.EB01
Independence	Classify common objects and	Describe and compare objects in	Identify the uses of common
Extended	substances according to	terms of weight and width.	household and agricultural
Benchmark	observable attributes/properties.	terms or weight and wath.	materials in terms of risk/benefit
Benefittark	observable attributes, properties.	Key concepts: Limit to standard	balance.
Classroom/LEA/ISD	Key concepts: Texture—rough,	measures; not metric.	Data ICC.
and State	smooth. Flexibility—rigid, stiff,	measures, not metric.	Key concepts: Risk/benefit
and State		Pool world contaxts: Massuring	•
	firm, flexible, strong. Hardness.	Real-world contexts: Measuring	analysis.
	Smell—pleasant, unpleasant.	common objects and substances,	Deal would and but a life of the
	States of matter—solid, liquid,	such as personal weight, clothes	Real-world contexts: Identifying
	gas. Magnetic properties—	sizes, furniture; grocery	warnings when using herbicides;
	attract, repel, push, pull. Size—	shopping; hanging pictures;	refrigerants; fertilizers; cleaning
	larger, smaller; length, width,	building trades.	products—detergents, household
	height. Sink, float. Color—		products; trade materials;
	common color words. Shape—		medications.
	Circle, square, triangle,		
	rectangle, oval. Weight—heavy,		
	light, heavier, lighter.		
	Real-world contexts: Common		
	objects, such as desks, coins,		
	pencils, buildings, snowflakes;		
	common substances, including		
	solids, such as copper, iron,		
	wood, plastic, Styrofoam;		
	liquids, such as water, alcohol,		
	milk, juice; gases, such as air,		
	helium, water vapor. Grocery		
	shopping (bagging), road signs		
	(colors).		
	(COIOIS).		

Draft Supported
Independence
Extended
Benchmark

S.SI.P.ME.e.EB01

Identify physical attributes/properties of objects.

Classroom/LEA/ISD and State

Key concepts: Texture—rough, smooth. Flexibility—rigid, stiff, firm, flexible, strong. Hardness. Smell—pleasant, unpleasant. States of matter—solid, liquid, gas. Size—larger, smaller; length, width, height. Sink, float. Color—common color words. Shape—Circle, square, triangle, rectangle, oval. Weight—heavy, light, heavier, lighter.

Real-world contexts: Leisure activities (swimming, bowling), clothing choice, personal hygiene, carrying objects, environmental/safety signs.

S.SI.P.ME.m.EB01

Identify and describe physical attributes/properties of objects.

Key concepts: States of matter—solid, liquid, gas. Size—larger, smaller; width. Sink, float. Weight—heavy, light, heavier, lighter.

Real-world contexts: Leisure activities (swimming, bowling), clothing choice, carrying objects.

S.SI.P.ME.h.EB01

Identify and describe physical attributes/properties of objects.

Key concepts: Texture—rough, smooth. Flexibility—rigid, stiff, firm, flexible, strong. Hardness. Smell—pleasant, unpleasant. States of matter—solid, liquid, gas. Size—larger, smaller; length, width, height. Sink, float. Color—common color words. Shape—Circle, square, triangle, rectangle, oval. Weight—heavy, light, heavier, lighter.

Real-world contexts: Leisure activities (swimming, bowling), clothing choice, personal hygiene, carrying objects, environmental/safety signs.

Draft Participation Extended Benchmark
Classroom/LEA/ISD and State

S.PA.P.ME.e.EB01Identify physical attributes/properties of objects.

Key concepts: Texture—rough, smooth. Smell—pleasant, unpleasant. Size—larger, smaller. Color—common color words. Shape—circle, square, triangle. Weight—heavy, light.

Real-world contexts: Leisure activities, clothing choice, personal hygiene, carrying objects, environmental signs, animals.

S.PA.P.ME.m.EB01

Identify and describe physical attributes/properties of objects.

Key concept: Size—larger, smaller. Sink, float. Weight—heavy, light, heavier, lighter.

Real-world contexts: Leisure activities, clothing choice, carrying objects.

S.PA.P.ME.h.EB01

Identify and describe physical attributes/properties of objects.

Key concepts: Texture—rough, smooth. Flexibility—rigid, stiff, firm, flexible, strong. Hardness. Smell—pleasant, unpleasant. States of matter—solid, liquid. Size—larger, smaller; length, width, height. Sink, float. Color—common color words. Shape—circle, square, triangle, rectangle, oval. Weight—heavy, light, heavier, lighter.

Real-world contexts: Leisure activities, clothing choice, personal hygiene, carrying objects, environmental signs.

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	IV.1.e.2 Identify properties of materials which make them useful. Key concepts: Useful properties—unbreakable, water-proof, light-weight, conducts electricity (see PME-IV.1 e.4, electric circuits), conducts heat, attracted to a magnet, clear. See EG-V.1 e.4 (uses of earth materials). Real-world contexts: Appropriate selection of materials for a particular use, such as waterproof raincoat, cotton or wool for clothing, glass for windows, metal pan to conduct heat, copper wire to conduct electricity.	Explain when length, mass, weight, density, area, volume or temperature are appropriate to describe the properties of an object or substance. Key concepts: Appropriate metric (s.i.) units. See C-I.1 m.4 (use measuring devices). Measurement tools: Balances, spring scales, measuring cups or graduated cylinders, thermometers, metric ruler. Real-world contexts: Common substances such as those listed in PME-IV.1 e.1; hot and cold substances, such as ice, snow, cold water, hot water, steam, cold air, hot air.	Identify properties of common families of elements. Key concepts: Properties—state, reactivity, metal/non-metal, conductivity. Tools: Various element samples. Real-world contexts: Highly reactive metals (such as potassium, sodium), less-reactive metals (such as calcium), highly reactive nonmetals (such as chlorine, fluorine, and oxygen), almost completely non-reactive gases (such as helium and neon); relationships on the Periodic Table of Elements.

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Draft Functional	S.FI.P.ME.e.EB02	S.FI.P.ME.m.EB02	n/a
Independence	Identify properties of materials	Identify when length, weight,	
Extended	that make them useful.	area, volume, or temperature is	
Benchmark		appropriate to describe the	
	Key concepts: Useful	properties of an object or	
Classroom/LEA/ISD	properties—unbreakable,	substance.	
and State	waterproof, lightweight, conducts		
	heat.	Key concepts: Appropriate	
		standard units.	
	Real-world contexts: Appropriate		
	selection of materials for a	Real-world contexts:	
	particular use, such as clothing	Measurement of ice, snow, hot	
	selection, energy conservation,	water, classroom dimensions,	
	and cooking (waterproof	soda pop volume. Also,	
	raincoat, cotton or wool for	appropriate measurements for	
	clothing, glass for windows,	use in clothing selection,	
	metal pan to conduct heat).	cooking, shopping, restaurants	
	,	and food services.	
Draft Supported	S.SI.P.ME.e.EB02	S.SI.P.ME.m.EB03	n/a
Independence	Identify how materials are	Identify when weight, length,	
Extended	useful.	and temperature are appropriate	
Benchmark		to describe an object.	
	Key concepts: Useful	3	
Classroom/LEA/ISD	properties—unbreakable,	Key concepts: Temperature, size	
and State	waterproof, lightweight.	(measured to the inch),	
		heavy/light.	
	Real-world contexts: Raincoat,	3 3	
	rubber boots, flotation device.	Real-world contexts: Seasons,	
		clothing, food (preparation,	
		storage, serving), health	
		(weight, height), cleansing with	
		appropriate water.	
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Draft Participation	S.PA.P.ME.e.EB02	S.PA.P.ME.m.EB02	n/a
Extended	Identify how materials are	Explore activities to show how	
Benchmark	useful.	materials are useful.	
Classroom/LEA/ISD	Key concepts: Useful	Key concepts: Useful	
	properties—waterproof,	properties—unbreakable,	
	lightweight.	waterproof, lightweight, conducts	
		heat.	
	Real-world contexts: Raincoat,		
	rubber boots, flotation device.	Real-world contexts: Raincoat,	
		rubber boots, flotation device,	
		heading pad, cooking and food	
		preparation (pan is hot),	
		indicating texture/temperature	
		preference.	

All students will explain what the world around us is made of:			
	,		
	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	Classify substances as elements, compounds, or mixtures, and justify classifications in terms of atoms and molecules. Key concepts: Element, compound, mixture, molecule, atom. See PME-IV.1 m.4 (molecular structure of solids, liquids and gases). Real-world contexts: Common substances such as those listed above, including—elements, such as copper, aluminum, sulfur, helium, iron; compounds, such as water, salt, sugar, carbon dioxide; mixtures, such as soil,	Explain how elements differ, in terms of the structural parts and electrical charges of atoms. Key concepts: Parts of atoms—nucleus, electron cloud. Subatomic particles—proton, neutron, electron. Electrical charges—positive, negative, neutral. Each element has a unique number of protons. See PMO-IV.3 m.3 (electric force). Real-world contexts: All elements.
Draft Functional	S.FI.P.ME.e.EBOA	salt and pepper, salt water, air. S.FI.P.ME.m.EB03	S.FI.P.ME.h.EB02
Independence Extended Benchmark	Identify mixtures or components of mixtures. Key concepts: Solid, liquid,	Recognize that all items are made of smaller particles. Key concepts: Element,	Identify the structural parts and electrical charges of atoms. Key concepts: Parts of atoms—
Classroom/LEA/ISD and State	mixture. Real-world contexts: Powdered drink, chocolate mix and liquid, mixture (trail mix, salad), gelatin.	compound, mixture, molecule, atom. Real-world contexts: Items such as water, salt, and carbon dioxide. In cooking, powdered drink mix.	nucleus, electron cloud. Subatomic particles—proton, neutron, electron. Electrical charges—positive, negative, neutral. Real-world contexts: All elements. For example, charging batteries in

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Draft Supported	S.SI.P.ME.e.EB03	S.SI.P.ME.m.EB04	S.SI.P.ME.h.EB03
Independence	Identify mixtures or components	Identify mixtures or components	Identify materials (solids and
Extended	of mixtures.	of mixtures.	liquids) that when mixed together
Benchmark			form a new product
	Key concepts: Solid, liquid,	Key concepts: Solid, liquid,	(mixture/solution).
Classroom/LEA/ISD	mixture.	mixture, dissolve.	
and State			Key concepts: Solid, liquid,
	Real-world contexts: Powdered	Real-world contexts: Powdered	mixture, dissolve, solution.
	drink, chocolate mix and liquid,	drink, chocolate mix and liquid,	
	mixture (trail mix, salad),	mixture (trail mix, salad),	Real-world contexts: Powdered
	gelatin.	gelatin.	drink, chocolate mix and liquid,
			mixture (trail mix, salad), gelatin,
			cleansing solutions, fertilizers.
Draft Participation	n/a	S.PA.P.ME.m.EB03	S.PA.P.ME.h.EB03
Extended		Identify mixtures or components	Identify mixtures or components
Benchmark		of mixtures.	of mixtures.
Classroom/LEA/ISD		Key concepts: Solid, liquid,	Key concepts: Solid, liquid,
and State		mixture.	mixture.
		Real-world contexts: Powdered	Real-world contexts: Powdered
		drink, chocolate mix and liquid,	drink, chocolate mix and liquid,
		mixture (trail mix, salad),	mixture (trail mix, salad), gelatin.
		gelatin.	(i. a.i. i.i.i., balaz), goldtiili
		J	l

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	IV.1.m.4 Describe the arrangement and motion of molecules in solids, liquids, and gases. Key concepts: Arrangement—regular pattern, random. Distance between molecules—closely packed, separated. Molecular motion—vibrating, bumping together, moving freely. (PCM-IV.2 m.4 addresses the molecular explanations of changes of state.) Real-world contexts: Common solids, liquids, and gases, such as those listed above.	None
Draft Functional Independence Extended Benchmark Classroom/LEA/ISD and State	n/a	n/a	S.FI.P.ME.h.EB03 Describe the arrangement and motion of molecules in solids, liquids, and gases. Key concepts: Arrangement— regular pattern, random. Distance between molecules— closely packed, separated. Molecular motion—vibrating, bumping together, moving freely. Real-world contexts: Common
			solids vs. liquids, such as in cooking—boiling water, freezing materials; expansions—roads, bridges.

Draft Supported Independence Extended Benchmark			
Draft Participation			
Extended			
Benchmark			
All students wil	l identify and describe form	ns of energy:	
	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	IV.1.e.3 Identify forms of energy associated with common phenomena. Key concepts: Heat, light, sound, food energy, energy of motion, electricity (see PCM-IV.2 e.1 about heat, PWV-IV.4 e.1-4 about light and sound, PME IV.1 e.4 about electricity, LEC-III.5 e.2 about energy from food). Real-world contexts: Appropriate selection of energy and phenomena, such as appliances like a toaster or iron that use electricity, sun's heat to melt chocolate, water wheels, wind-up toys, warmth of sun on skin, windmills, music from guitar, simple electrical circuits with batteries, bulbs and bells.	None	None

Draft Functional		
Independence		
Extended		
Benchmark		
Draft Supported		
Independence		
Extended		
Benchmark		
Draft Participation		
Extended		
Benchmark		



All students will explain how electricity and magnetism (see Motion of Objects) interact with matter:

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	IV.1.e.4 Construct simple, useful electrical circuits.	IV.1.m.5 Construct simple circuits and explain how they work in terms of the flow of current.	IV.1.h.4 Explain how current is controlled in simple series and parallel circuits.
	Key concepts and tools: Complete loop; batteries, bulbs, bells, motors, wires, electrical switches (see PME-IV.1 e.2, materials that conduct electricity). Real-world contexts: Flashlights, battery-powered toys.	Key concepts and tools: Complete circuit, incomplete circuit, short circuit, current, conductors, nonconductors, batteries, household current, bulbs, bells, motors, electrical switches. Real-world contexts: Household wiring, electrical conductivity testing, electric appliances.	Key concepts: Single path, multiple paths, switches, fuses, circuit breakers, power supply, batteries, household current, motors, bulbs, circuit diagrams. Real-world contexts: Basic household wiring, automobile wiring, flashlights, tree lights, power lines; electrical conductivity testing.
Draft Functional	S.FI.P.ME.e.EB03	S.FI.P.ME.m.EB04	S.FI.P.ME.h.EB04
Independence	Identify and construct simple,	Construct simple circuits and	Explore how current is controlled
Extended	useful electrical circuits.	identify how they work in terms	in simple and parallel circuits.
Benchmark		of the flow of current.	
	Key concepts/Tools: Complete		Key concepts: Single path,
Classroom/LEA/ISD	loop; batteries, bulbs, bells,	Key concepts: Complete circuit,	multiple paths, switches, fuses,
and State	motors, wires, electrical	incomplete circuit (open, closed),	circuit breakers, power supply,
	switches.	current, conductors, non-	batteries, household current,
		conductors, batteries, bulbs,	motors, bulbs, circuit diagrams.
	Real-world contexts: Replacing	bells, electrical switches,	
	light bulbs and batteries in	electrical appliances, and	Real-world contexts: Using
	flashlights and battery-powered	electrical toys.	household appliances, basic
	toys.	Deal would content to Helica	household wiring, flashlights, tree
		Real-world contexts: Using	lights, power lines, automotive
		household appliances, household wiring, electric appliances;	wiring; electrical conductivity testing; trades—automotive,
		electrical conductivity testing;	HVAC, building trades, computers.
		trades—automotive, HVAC,	TIVAC, building trades, computers.
		building trades, computers.	
	1	banang trados, compaters.	

Draft Supported	S.SI.P.ME.e.EB04	S.SI.P.ME.m.EB05	S.SI.P.ME.h.EB04
Independence	Identify and use electrical	Identify useful electrical circuits.	Identify useful electrical circuits.
Extended	circuits.		3
Benchmark		Key concepts: Open and closed	Key concepts: Open and closed
	Key concepts: Electric, non-	circuits, complete, incomplete.	circuits, complete, incomplete,
Classroom/LEA/ISD	electric, battery-operated, non-		switch/power supply.
and State	battery-operated.	Real-world contexts: Recognizing	
		and requesting need to	Real-world contexts: Recognizing
	Real-world contexts: Tape	charge/change batteries and	and requesting need to
	recorder, battery-powered toys	electrical devices (cooking,	charge/change batteries and
	and gadgets, recordable	hearing aids, wheelchairs, tape	electrical devices (cooking,
	switches.	recorders, light bulbs).	hearing aids, wheelchairs, tape
			recorders, light bulbs); labeling
			and proper use of items
			associated with electricity (outlet,
			cords, switches).
Draft Participation	S.PA.P.ME.e.EB03	S.PA.P.ME.m.EB04	S.PA.P.ME.h.EB04
Extended	Identify parts of electrical circuits	Operate useful electrical circuits.	Identify and use electrical circuits.
Benchmark	in common activities.		
		Key concepts: Switches.	Key concepts: Electric, non-
Classroom/LEA/ISD	Key concepts: Switches.		electric, battery-operated, non-
and State		Real-world contexts: Operating	battery-operated.
	Real-world contexts: Operating	switch, tape recorder, battery-	
	switch, tape recorder, battery-	powered toys and gadgets,	Real-world contexts: Tape
	powered toys and gadgets,	recordable switches, lights	recorder, battery-powered toys
	recordable switches, lights	on/off, wheelchairs,	and gadgets, recordable switches,
	on/off, wheelchairs,	communication.	wheelchairs, communication.
	communication.		

	Elementary School	Middle School	High School
Science Benchmark	IV.1.e.5	IV.1.m.6	IV.1.h.5
MCF v.2000	Describe possible electrical hazards to be avoided at home and at school.	Investigate electrical devices and explain how they work, using instructions and appropriate safety precautions.	Describe how electric currents can be produced by interacting wires and magnets, and explain applications of this principle.
	Key concepts: Shock, wall outlet, hazards; see PMEIV.1 e.3 (electrical energy).	Key concepts: Flow of electricity for energy or information transfer. Safety precautions for	Key concepts: Current flow and direction, magnetic fields. See PMO-IV.3 m.4 (magnetism from
	Real-world contexts: Electric outlets, power lines, frayed electric cords, electric	using electrical appliances; grounding. Documentation for toys and appliances—wiring	electricity). Real-world contexts: Generators,
	appliances, lightning, hair dryers in sinks and tubs.	diagrams, written instructions. (See PCM-IV.2 m.3, transformations of energy.)	alternating current, direct current.
		Real-world contexts: Situations requiring assembly, use, or	
		repair of electrical toys, radios, or simple appliances, such as replacing batteries and bulbs;	
		connecting electrical appliances, such as stereo systems, TV's and	
		videocassette recorders, computers and computer components.	
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Draft Functional	S.FI.P.ME.e.EB04	S.FI.P.ME.m.EB05	S.FI.P.ME.h.EB05
Independence	Identify possible electrical	Investigate electrical devices,	Identify/state safety
Extended	hazards to be avoided at home	using instructions and	rules/precautions related to
Benchmark	and at school.	appropriate safety precautions.	common household appliances
			that use electric motors.
Classroom/LEA/ISD	Key concepts: Shock, power line,	Key concepts: Safety precautions	
and State	electric outlet, electric	for using electrical appliances;	Key concepts: Safety precautions
	appliances, lightning, hazards.	grounding.	for using electrical appliances;
			grounding.
	Real-world contexts: Safety in	Real-world contexts: Situations	
	storms (lightning, power lines);	requiring use of simple	Real-world contexts: Situations
	safety in the house (electric	appliances, such as replacing	requiring the use of simple
	outlets, frayed electric cords,	light bulbs/batteries; following	appliances; use of electricity and
	safe use of electric appliances	instructional manuals; hooking	water, grounding; rules and
	(hair dryer in sink/tub, knife in	up appliances.	regulations concerning careers in
	toaster).		electrical and building trades.
Draft Supported	S.SI.P.ME.e.EB05	S.SI.P.ME.m.EB06	S.SI.P.ME.h.EB05
Independence	Identify possible electrical	Use instructions and appropriate	Use instructions and appropriate
Extended	hazards to be avoided at home	safety precautions with electrical	safety precautions with devices
Benchmark	and at school.	devices.	that use electric motors.
Classroom/LEA/ISD	Key concepts: Shock, power line,	Key concepts: Shock, power line,	Key concepts: Shock, power line,
and State	electric outlet, electric	electric outlet, electric	electric outlet, electric appliances,
	appliances, lightning.	appliances, lightning.	lightning.
	Real-world contexts: Safety in	Real-world contexts: Safety in	Real-world contexts: Safety in
	storms, safety in the house (hair	storms, safety in the house (hair	storms, safety in the house (hair
	dryer in sink/tub, knife in	dryer in sink/tub, knife in	dryer in sink/tub, knife in toaster,
	toaster, finger in outlet).	toaster, finger in outlet); electric	finger in outlet); electric
		appliances (household);	appliances (household); replacing
		replacing light bulbs/batteries.	light bulbs/batteries.
Draft Participation			
Extended			
Benchmark			

SCIENCE STRAND: CHANGES IN MATTER (CM)

All students will investigate, describe and analyze ways in which matter changes:

	Elementary School	Middle School	High School
Science Benchmark	IV.2.e.1	IV.2.m.1	None
MCF v.2000	Describe common physical	Describe common physical	None
WC1 V.2000	changes in matter—size, shape;	changes in matter: evaporation,	
	melting, freezing (K-2);	condensation, sublimation,	
	dissolving, evaporating (3-5).	thermal expansion and	
	g,pg (c -).	contraction.	
	Key concepts: States of matter—		
	solid, liquid, gas. Changes in	Key concepts: States of matter—	
	size and shape—bending,	solid, liquid, gas. Processes that	
	tearing, breaking. Processes that	cause changes of state or	
	cause changes of state: heating,	thermal effects: heating, cooling.	
	cooling. See EH-V.2 e.1 (water in	Boiling. Mass/weight remains	
	three states).	constant during physical changes	
	Deal world and A Observation	in closed systems.	
	Real-world contexts: Changes in	Dool world overtexts States of	
	size or shape of familiar objects, such as making snowballs,	Real-world contexts: States of	
	breaking glass, crumbling	matter—solid, liquid, gas. Changes in state, such as water	
	cookies, making clay models,	evaporating as clothes dry,	
	carving wood, breaking bones;	condensation on cold window	
	changes in state of water or	panes, disappearance of snow or	
	other substances, such as	dry ice without melting;	
	freezing of ice cream, or ponds,	expansion of bridges in hot	
	melting wax or steel, puddles	weather, expansion and	
	drying up.	contraction of balloons with	
		heating and cooling; solid air	
		fresheners.	

Draft Functional	S.FI.P.CM.e.EB01	S.FI.P.CM.m.EB01	n/a
Independence	Identify common physical	Describe common physical	
Extended	changes in matter—size, shape,	changes in matter: evaporation,	
Benchmark	melting, freezing, dissolving,	condensation, expansion, and	
	evaporating.	contraction.	
Classroom/LEA/ISD			
and State	Key concepts: States of matter—	Key concepts: Processes that	
	solid, liquid, gas. Changes in	change states of matter—	
	size and shape—	heating, cooling, boiling.	
	bending, tearing, breaking.	3.	
	Processes that cause changes of	Real-world contexts: States of	
	state—heating, cooling.	matter—solid, liquid, gas.	
	3, 3	Changes in state, such as water	
	Real-world contexts: Changes in	evaporating as clothes dry,	
	size or shape of familiar objects,	condensation on cold window	
	such as making snowballs,	panes, disappearance of snow or	
	breaking glass, crumbling	dry ice without melting;	
	cookies, making clay models,	expansion of bridges in hot	
	carving wood, breaking bones;	weather, expansion and	
	changes in state of water or	contraction of balloons with	
	other substances, such as	heating and cooling; solid air	
	freezing of ice cream or ponds,	fresheners; weather conditions;	
	melting wax or steel, puddles	hobbies—fishing, melting ice.	
	drying up; weather conditions;	Hebbics Halling, Hieraring loc.	
	cooking (powdered drink mix).		
Draft Supported	S.SI.P.CM.e.EB01	S.SI.P.CM.m.EB01	n/a
Independence	Identify changes in states of	Identify and predict changes in	11/ G
Extended	matter in melting, freezing,	the states of matter in melting,	
Benchmark	boiling, and evaporation.	freezing, boiling, and	
Bonomian	Soming, and evaporation.	evaporation.	
Classroom/LEA/ISD	Key concepts: Solid, liquid, gas.	evaporation.	
Glassi Golli/ ELA/ ISD	Ney concepts. Solid, fiquid, gas.	Key concepts: Solid, liquid, gas,	
	Real-world contexts: Boiling	evaporation.	
	water, ice cream, ice cubes,		
	snow to water.	Real-world contexts: Ice cream	
	SHOW to water.	in sun, snow in warmth, salt	
		melting ice.	
		I menny ice.	

Draft Participation	S.PA.P.CM.e.EB01	S.PA.P.CM.m.EB01	n/a
Extended	Identify changes in matter in	Identify changes in matter in	
Benchmark	common activities.	common activities.	
Classroom/LEA/ISD	Key concepts: Melting, frozen,	Key concepts: Melting, frozen,	
	cold, hot, warm.	cold, hot, warm, solid to liquid.	
	Real-world contexts: Holding ice	Real-world contexts: Holding ice	
	cube in hand (melting), ice	cube in hand (melting), ice	
	cream, popsicle.	cream, popsicle.	
	Elementary School	Middle School	High School
	-		
Science Benchmark	IV.2.e.2	IV.2.m.2	None
MCF v.2000	Prepare mixtures and separate	Describe common chemical	
	them into their component parts.	changes in terms of properties of	
		reactants and products.	
	Key concepts: Mixture, solution.		
	Separation techniques—(K-2)	Key concepts: Common chemical	
	filtration, using sieves, using	changes—burning, rusting iron,	
	magnets, floating vs. sinking; (3-	formation of sugars during	
	5) dissolving soluble substances,	photosynthesis, acid reacting	
	evaporating.	with metal and other substances.	
		Mass/weight remains constant in	
	Tools: Filter paper, funnels,	closed systems.	
	magnets, sieves, beakers, solar		
	stills.	Real-world contexts: Chemical	
		changes—burning,	
	Real-world contexts: Mixtures of	photosynthesis, digestion,	
	various kinds—salt and pepper,	corrosion, acid reactions,	
	iron filings and sand, sand and	common household chemical	
· ·	sugar, rocks and wood chips,	reactions such as with alkaline	
	sand and gravel, sugar or salt	drain cleaners.	
	solutions.	Grain dicariors.	
	Solutions.		

		·	
Draft Functional	S.FI.P.CM.e.EB02	S.FI.P.CM.m.EB02	n/a
Independence	Prepare mixtures and separate	Describe common chemical	
Extended	them into their component parts.	changes in terms of properties of	
Benchmark		reactants and products.	
	Key concepts: Mixture, solution.		
Classroom/LEA/ISD	Separation techniques—filtration,	Key concepts: Common chemical	
and State	using sieves, using magnets,	changes—burning, rusting iron,	
	floating vs. sinking, dissolving	acid reacting with metal and	
	soluble substances, evaporating.	other substances.	
	Tools: Filter paper, funnels,	Real-world contexts: Chemical	
	magnets, sieves, beakers.	changes—burning,	
		photosynthesis, digestion,	
	Real-world contexts: Common	corrosion, acid reactions,	
	mixtures of various kinds—salt	common household chemical	
	and pepper, sand and sugar,	reactions, such as with alkaline	
	etc.; cooking.	drain cleaners; cooking;	
		automobile care; care of toys	
		and equipment (rain and	
		bicycles).	
Draft Supported			
Independence			
Extended			
Benchmark			
Draft Participation			
Extended			
Benchmark			

All students will explain how visible changes in matter are related to atoms and molecules: **Elementary School** Middle School **High School** Science Benchmark None IV.2.m.3 IV.2.h.1 Explain physical changes in Explain chemical changes in terms MCF v.2000 terms of the arrangement and of the breaking of bonds and the rearrangement of atoms to form motion of atoms and molecules. new substances. Key concepts: Molecular descriptions of states of matter— Key concepts: atom, molecule, see PME-IV.1 m.4. Changes in ion, bond, reactant, product; state of matter-melting, conservation of mass; rate of freezing, evaporation, reaction—temperature, surface condensation; thermal expansion area, concentration; specific and contraction (see chemical reactions—burning paper PCM-IV.2 m.1). Speed of or wood, rusting iron, formation of molecular motion— moving sugars during photosynthesis. See faster, slower, vibrate, rotate, PME-IV.1 h.3 (structure of the unrestricted motion; change in atom). speed of molecular motion with change in temperature. Real-world contexts: Examples of chemical changes—See PCM-IV.2 Real-world contexts: See m.2. examples of physical changes of matter, PCM-IV.2 e.1 and m.1. **Draft Functional** Independence Extended Benchmark **Draft Supported** Independence Extended Benchmark **Draft Participation** Extended Benchmark

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	None	Explain why mass is conserved in physical and chemical changes. Key concepts: atom, molecule, mass. Real-world contexts: Common physical and chemical changes, including matter cycles in
			ecosystems.
Draft Functional Independence Extended Benchmark			
Draft Supported Independence Extended Benchmark			
Draft Participation Extended Benchmark			

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	None	IV.2.h.3 Contrast nuclear fission, nuclear fusion, and natural radioactivity.
			Key concepts: Nucleus, nuclear change, force that hold nucleus together, nuclear energy. Stable and unstable isotopes. Properties—mass, element, radioactivity. See PME-IV.1 h.3 (structure of the atom).
			Real-world contexts: Nuclear power plants, nuclear energy from sun, natural radioactive decay, use of radiation and radioactive isotopes in medicine.
Draft Functional Independence Extended Benchmark			
Draft Supported Independence Extended Benchmark			
Draft Participation Extended Benchmark			

All students will explain how changes in matter are related to changes in energy and how living things and human technology change matter and transform energy:

	Τ .	T .	
Draft Functional	n/a	S.FI.P.CM.m.EB03	S.FI.P.CM.h.EB01
Independence		Identify that energy is involved	Identify common energy
Extended		in physical changes.	transformations in everyday
Benchmark			situations.
		Key concepts: Common physical	
Classroom/LEA/ISD		changes—melting, burning,	Key concepts: Forms of energy,
and State		fireworks.	including mechanical, heat,
			sound, light, electrical, magnetic,
		Real-world contexts:	chemical, food energy. Total
		Heat/melting.	amount of energy remains
			constant in all transformations.
			Real-world contexts: Motors,
			generators, power plants, light
			bulbs, appliances, cars, radios,
			televisions, walking, playing a
			musical instrument, cooking food,
			batteries, body heat,
			photosynthesis.
Draft Supported			priotosyritricsis.
Independence			
Extended			
Benchmark Draft Participation			
Draft Participation			
Extended			
Benchmark			

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	None	IV.2.h.5 Explain changes in matter and energy involving heat transfer.
			Key concepts: Mechanisms of heat transfer —convection, conduction, radiation. Conservation of energy, efficiency. Changes in matter related to heat transfer—changes in temperature, volume, pressure. See PCM-IV.2 m.1 (thermal expansion), EAW-V.3 h.3 (convection).
			Real-world contexts: Convection currents, lake turnover, wind, hot frying pans, heating and cooling buildings, heat lamps, sunlight heating the earth, greenhouse effect, fires for warming.
Draft Functional Independence Extended Benchmark			
Draft Supported Independence Extended Benchmark			
Draft Participation Extended Benchmark			

SCIENCE STRAND: MOTION OF OBJECTS (MO)

All students will describe how things around us move, explain why things move as they do, and demonstrate and explain how we control the motions of objects:

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	IV.3.e.1 Describe or compare motions of common objects in terms of speed and direction.	IV.3.m.1 Qualitatively describe and compare motion in two dimensions.	None
	Key concepts: Words—east, west, north, south, right, left, up, down. Speed words—fast, slow, faster, slower.	Key concepts: Two-dimensional motion—up, down, curved path. Speed, direction, change in speed, change in direction.	
	Real-world contexts: Motions of familiar objects in two dimensions, including rolling or thrown balls, wheeled vehicles, sliding objects.	Real-world contexts: Objects in motion, such as thrown balls, roller coasters, cars on hills, airplanes.	
Draft Functional	S.FI.P.MO.e.EB01	S.FI.P.MO.e.EB0B	n/a
Independence	Describe motions of common	Compare motions of common	
Extended Benchmark	objects in terms of speed and direction.	objects in terms of speed and direction.	
Classroom/LEA/ISD and State	Key concepts: Words—east, west, north, south, right, left, up, down. Speed words—fast,	Key concepts: Relative motion, faster/slower.	
	slow, faster, slower.	Real-world contexts: Motions of familiar objects in two	
	Real-world contexts: Motions of	dimensions, including rolling or	
	familiar objects in two	thrown balls, wheeled vehicles,	
	dimensions, including rolling or	sliding objects; navigating, speed	
	thrown balls, wheeled vehicles,	(up hills, down hills).	
	sliding objects; navigating, speed (up hills, down hills).		

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Draft Supported	S.SI.P.MO.e.EB01	S.SI.P.MO.m.EB01	n/a
Independence	Recognize movement of objects,	Respond accurately to directions	
Extended	including the body.	of motion.	
Benchmark			
	Key concepts: Right/left,	Key concepts: Right/left,	
Classroom/LEA/ISD	up/down, fast/slow,	up/down, fast/slow,	
and State	faster/slower, push/pull.	faster/slower, push/pull;	
	Table Tabl	navigation.	
	Real-world contexts: Wheelchair,		
	running/walking, leisure	Real-world contexts: Wheelchair,	
	activities (rolling and throwing	running/walking, leisure	
	ball, bicycle).	activities (rolling and throwing	
	ball, bicycle).	ball, bicycle); indicating	·
		preference (right-/left-handed),	
		direction (turn left/right,	
Dueft Deutisia ation	C DA D MO - FD04	stop/go). S.PA.P.MO.m.EB01	n/a
Draft Participation	S.PA.P.MO.e.EB01		n/a
Extended	Identify motions of the body in	Identify motions of the body in	
Benchmark	common activities.	common activities.	
Classroom/LEA/ISD	Key concepts: Up and down,	Key concepts: Up and down,	
and State	slide, fast/slow, push/pull; how	slide, fast/slow, push/pull; how	
	items move; navigation.	items move; navigation.	
	Real-world contexts: Daily living	Real-world contexts: Daily living	
	activities (scooter board,	activities (scooter board,	
	wheelchair); leisure activities	wheelchair); leisure activities	
	(rolling ball); mobility; physical	(rolling ball); mobility; physical	
	therapy.	therapy.	

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	Elementary School IV.3.e.2 Explain how forces (pushes or pulls) are needed to speed up, slow down, stop, or change the direction of a moving object. Key concepts: Changes in motion—speeding up, slowing down, turning. Common forces—push, pull, friction, gravity. Size of change is related to strength of push or pull. Real-world contexts: Playing ball, moving chairs, sliding objects.	IV.3.m.2 Relate motion of objects to unbalanced forces in two dimensions. Key concepts: Changes in motion and common forces—speeding up, slowing down, turning, push, pull, friction, gravity, magnets. Constant motion and balanced forces. Additional forces—attraction, repulsion, action/reaction pair (interaction force), buoyant force. Size of change is related to strength of unbalanced force and mass of object. Real-world contexts: Changing the direction—changing the direction of a billiard ball, bus turning a corner; changing the	None

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Draft Functional	S.FI.P.MO.e.EBOC	S.FI.P.MO.m.EB01	n/a
Independence	Identify forces (pushes/pulls)	Identify forces (pushes/pulls)	
Extended	that speed up, slow down, stop,	that speed up, slow down, stop,	
Benchmark	or change the direction of a	or change the direction of a	
	moving object.	moving object.	
Classroom/LEA/ISD			
and State	Key concepts: Changes in	Key concepts: Changes in	
	motion—speeding up, slowing	motion—speeding up, slowing	
	down, turning. Common	down, turning. Common	
	forces—push, pull, friction,	forces—push, pull, friction,	
	gravity. Size of change is	gravity. Size of change is	
	related to strength of push or	related to strength of push or	
	pull.	pull.	
	Real-world contexts: Playing ball,	Real-world contexts: Playing ball,	
	moving chairs, sliding objects;	moving chairs, sliding objects;	
	sports; motored and non-	sports; motored and non-	
	motored vehicles (bicycle,	motored vehicles (bicycle,	
	automobile);	automobile);	
	accelerating/decelerating.	accelerating/decelerating.	
Draft Supported	n/a	n/a	S.SI.P.MO.h.EB01
Independence			Identify the forces that speed up
Extended			and slow down motion.
Benchmark			
			Key concepts: Right/left,
Classroom/LEA/ISD			up/down, fast/slow, faster/slower;
and State			push/pull; change in speed,
			gravity, friction; navigation.
			Real-world contexts: Wheelchair,
			running/walking, leisure activities
			(rolling and throwing ball,
			bicycle); indicating preference
			(right-/left-handed), direction
			(turn left/right, stop/go);
			accelerating and decelerating.
Draft Participation			
Extended			
Benchmark			

	Elementary School	Middle School	High School	
Science Benchmark	IV.3.e.3	IV.3.m.3	None	
MCF v.2000	Describe patterns of interaction	Describe the non-contact forces		
	of magnetic materials with other	exerted by magnets, electrically		
	magnetic and non-magnetic materials.	charged objects, and gravity.		
	materials.	Key concepts: Electrical charges		
	Key concepts: Magnetic poles,	and magnetic poles—north pole,		
	magnetic attraction and	south pole, positive charge,		
	repulsion.	negative charge; mass, weight,	·	
		gravitational pull. Charging by		
	Tools: Magnets, variety of	rubbing or touching, electric		
	magnetic and nonmagnetic	attraction and repulsion. Force		
	materials (K-2), magnetic	depends on size of charges or		
	compass (3-5).	masses, and decreases quickly		
	Real-world contexts: Common	with distance. See PMO-IV.3 m.2		
		(forces and motion), PME-IV.1 m.2 (weight and mass).		
	magnets, using a magnetic compass to find direction.	III.2 (weight and mass).		
		Real-world contexts: Electrically		
		charged or polarized objects,		
		such as balloons rubbed on		
		clothing, bits of paper, salt		
		grains, static cling, magnets,		
		magnetic materials, earth's		
		gravitational pull on objects near		
		its surface, sun's gravitation pull		
		on solar system objects (see ES-		
		V.4 m.2).		

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Draft Functional	S.FI.P.MO.e.EB02	S.FI.P.MO.m.EB02	S.FI.P.MO.h.EB01
Independence	Identify patterns of interaction of	Describe patterns of interaction	Describe the non-contact forces
Extended	magnetic materials with other	of magnetic materials with other	exerted by magnets, electrically
Benchmark	magnetic and non-magnetic	magnetic and non-magnetic	charged objects, and gravity.
	materials.	materials.	
Classroom/LEA/ISD			Key concepts: Repel/attract.
and State	Key concepts: Magnetic poles,	Key concepts: Magnetic poles,	
	magnetic attraction and	magnetic attraction and	Real-world contexts: Electrically
	repulsion.	repulsion.	charged or polarized objects, such
	•		as balloons rubbed on clothing,
	Tools: Magnets, variety of	Tools: Magnets, variety of	bits of paper, salt grains, static
	magnetic and non-magnetic	magnetic and non-magnetic	cling, magnets, magnetic
	materials, magnetic compass.	materials, magnetic compass.	materials, earth's gravitational
			pull on objects near its surface,
	Real-world contexts: Common	Real-world contexts: Common	sun's gravitation pull on solar
	magnets, using a magnetic	magnets, using a magnetic	system objects; building trades
	compass to find direction.	compass to find direction.	(stud finders, screwdrivers);
	'		common household repairs; use
			of navigational compass.
Draft Supported	S.SI.P.MO.e.EB02	S.SI.P.MO.m.EB02	S.SI.P.MO.h.EB02
Independence	Explore activities using magnetic	Explore the uses of magnetic	Identify and use practical
Extended	and non-magnetic materials.	objects.	magnetic objects and tools.
Benchmark	and the grant of t		
25.15	Key concepts: Magnetic	Key concepts: What magnets	Key concepts: Positive/negative.
Classroom/LEA/ISD	push/pull.	attract or repel.	They comospies to control magazines.
	Passin Passi		Real-world contexts: Screwdriver,
	Real-world contexts: Exploring	Real-world contexts:	compass, roller coaster, magnet
	during play; refrigerator.	Refrigerator, screwdriver.	storage (not by credit cards,
	during play, reingerator.	Remigerator, sorewarrer.	disks, computers), medical safety.
Draft Participation	S.PA.P.MO.e.EB02	S.PA.P.MO.m.EB02	S.PA.P.MO.h.EB02
Extended	Explore activities using magnetic	Explore activities using magnetic	Identify activities using magnetic
Benchmark	and non-magnetic materials.	and non-magnetic materials.	and non-magnetic materials.
Donomian	and non magnetic materials.	and non magnetic materials.	and non magnetic materials.
Classroom/LEA/ISD	Key concepts: Magnetic	Key concepts: Magnetic	Key concepts: Magnetic push/pull.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	push/pull.	push/pull.	land the second part of the seco
	Page Page 1	Page Page	Real-world contexts: Exploring
	Real-world contexts: Exploring	Real-world contexts: Exploring	during play; letter board, games.
	during play; refrigerator, letter	during play; refrigerator, letter	daring play, letter board, games.
	board, games.	board, games.	
	Duaru, yarries.	poaru, yarries.	

	Elementary School	Middle School	High School	
Science Benchmark MCF v. 2000	None	IV.3.m.4 Use electric currents to create magnetic fields, and explain applications of this principle. Key concepts: Electric current, magnetic poles, magnetic fields. (See PME-IV.1 m.5, electric circuits.) Tools: Magnetic compass, battery, wire. Real-world contexts: Electromagnets, bells, speakers, motors, magnetic switches, Earth's magnetic field.	None	
Draft Functional Independence Extended Benchmark				
Draft Supported Independence Extended Benchmark				
Draft Participation Extended Benchmark				

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	IV.3.e.4 Identify and use simple machines and describe how they change effort. Key concepts: Inclined planes, levers, pulleys, wedges, wheel and axle; force, distance. Real-world contexts: Block and tackles, ramps, screwdrivers and screws, can openers, see-saws.	Design strategies for moving objects by application of forces, including the use of simple machines. Key concepts: Types of simple machines—lever, pulley, screw, inclined plane, wedge, wheel and axle, gear; direction change, force advantage, speed and distance advantage. Real-world contexts: Objects being moved by using simple machines, such as wagons on	Analyze patterns of force and motion in the operation of complex machines. Key concepts: Electrical and/or mechanical components of complex machines. Real-world contexts: Machines, such as bicycles, automobiles, pumps, electrical motors.
Draft Functional Independence Extended Benchmark Classroom/LEA/ISD	S.FI.P.MO.e.EB03 Identify and use simple machines to change effort. Key concepts: Inclined planes, levers, pulleys, wedges, wheel	inclined planes, heavy objects moved by levers, seesaw, cutting with knives or axes. S.FI.P.MO.m.EBOA Identify which simple machine is best used in a given situation. Key concepts: Types of simple machines.	S.FI.P.MO.h.EB02 Identify patterns of force and motion in the operation of complex machines. Key concepts: Common complex
and State	and axle; force, distance. Real-world contexts: Blocks and tackles, ramps, screwdrivers and screws, can openers, seesaws.	Real-world contexts: Blocks and tackles; screwdrivers and screws; can openers; objects being moved by using simple machines, such as wagons on inclined planes; heavy objects moved by levers; seesaw; cutting with knives or axes; building trades.	machines, such as bicycles and wheelchairs. Real-world contexts: Riding a bicycle.

		T	
Draft Supported	S.SI.P.MO.e.EB03	S.SI.P.MO.m.EB03	S.SI.P.MO.h.EB03
Independence	Recognize simple machines used	Identify simple machines used to	Identify simple machines used to
Extended	to change effort.	change effort.	change effort.
Benchmark			3
20110111111111	Key concepts: Lifts, ramps,	Key concepts: Levers, wheels	Key concepts: Levers, wheels and
Classroom/LEA/ISD	wheels, wedges (for position).	and axles, wedges (for position),	axles, wedges (for position),
and State	wheels, wedges (for position).	gears, pulley.	gears, pulley.
and State	Real-world contexts: Faucets,	gears, pulley.	gears, pulley.
	•	Dool would contain Door	Deal world santoute Dean bandle
	paper towel machine.	Real-world contexts: Door	Real-world contexts: Door handle,
		handle, bicycle, wheelchair, cart,	bicycle, wheelchair, cart, can
		can opener, door gears;	opener, door gears; repairing.
		repairing.	*
Draft Participation	S.PA.P.MO.e.EB03	S.PA.P.MO.m.EB03	S.PA.P.MO.h.EB03
Extended	Identify simple machines in	Identify simple machines in	Identify simple machines in
Benchmark	activities that change effort.	activities that change effort.	activities that change effort.
			•
Classroom/LEA/ISD	Key concepts: Lifts, ramps,	Key concepts: Lifts, ramps,	Key concepts: Lifts, ramps,
and State	wheels, wedges (for position).	wheels, wedges (for position).	wheels, wedges (for position).
	meno, mages (or promon,	most, rough (co. peomes).	and the second s
	Real-world contexts: Faucets,	Real-world contexts: Faucets,	Real-world contexts: Faucets,
	paper towel machine.	paper towel machine.	paper towel machine.
	paper tower macrine.	paper tower macrinic.	paper tower macrime.
	Elementary School	Middle School	High School
	Elementary serioer	Wildelie Seriooi	ingii scheel
Science Benchmark	IV.3.e.5	None	None
MCF v.2000	Manipulate simple mechanical		
	devices and explain how their		
	parts work together.		
	parts work together. Key concepts: Names and uses		
	parts work together. Key concepts: Names and uses for parts of machines, such as		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys,		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws,		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys,		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges.		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges. Real-world contexts: Simple		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges. Real-world contexts: Simple mechanical devices, such as		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges. Real-world contexts: Simple mechanical devices, such as bicycles, bicycle pumps, pulleys,		
	parts work together. Key concepts: Names and uses for parts of machines, such as levers, wheel and axles, pulleys, inclined planes, gears, screws, wedges. Real-world contexts: Simple mechanical devices, such as		

Draft Functional	n/a	S.FI.P.MO.m.EB03	n/a
Independence		Manipulate simple mechanical	
Extended		devices and explain how their	
Benchmark		parts work together.	
Classroom/LEA/ISD		Key concepts: Names and uses	
and State		for parts of machines, such as	
		levers, wheel and axles, pulleys,	
		inclined planes, gears, screws,	
		wedges.	
		Real-world contexts: Simple	
		mechanical devices, such as	
		bicycles, bicycle pumps, pulleys,	
		faucets, clothespins, can	
		openers; cooking; laundry;	
		household repairs.	
Draft Supported		Tiouseriora repairs.	
Independence			
Extended			
Benchmark			
Draft Participation			
Extended			
Benchmark			

All students wil	l relate motion to energy a	nd energy conversions:	
	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	None	Explain energy conversions in moving objects and machines. Key concepts: Types of energy—electrical energy, kinetic energy, gravitational potential energy, potential energy in springs, chemical potential energy, heat energy, radiation. Energy transformations—see PCM-IV.2 m.4. Efficiency. See PME-IV.1 h.4 (conservation of energy) and PCMIV.2 h.4 (energy in physical and chemical changes). Real-world contexts: Simple and complex machines, roller coasters, swings, pendulums, elevators, automobiles, fans, motors.
Draft Functional Independence Extended Benchmark			
Draft Supported Independence Extended Benchmark Draft Participation			
Extended Benchmark			

SCIENCE STRAND: WAVES AND VIBRATIONS (WV)

All students will describe sounds and sound waves:

Elementary School	Middle School	High School
IV.4.e.1	IV.4.m.1	IV.4.h.1
		Relate characteristics of sounds
properties.	through different media.	that we hear to properties of
Wasan and a Base and a suit also	V	sound waves.
		Variable Description of
nign, low. Loudness—loud, soft.	liquids, gases. vacuum.	Key concepts: Properties of sounds—pitch, volume.
Real-world contexts: Sound from	Real-world contexts: Sounds	Characteristics of sound waves—
		frequency, amplitude, velocity.
		Real-world contexts: Common
thunder, numan voices.		sounds that vary in pitch and
		volume—see PWV-IV.4 e.1.
S.FL.P.WV.e.FB01		S.FI.P.WV.h.EB01
		Recognize how sounds travel
properties.	through different media.	through different media.
Key concepts: Properties: pitch—	Key concepts: Media—solids,	Key concepts: Media—solids,
high, low; loudness—loud, soft.	liquids, gases.	liquids, gases.
		Real-world contexts: Sounds
·		traveling through solids, such as
		glass windows, strings, the earth;
	o o	sound traveling through liquids, such as dolphin and whale
		communication; sound traveling
	·	through gases, such as human
		hearing, sonic booms; health—
	health—hearing.	hearing.
	IV.4.e.1 Describe sounds in terms of their properties. Key concepts: Properties: pitch—high, low. Loudness—loud, soft. Real-world contexts: Sound from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices. S.FI.P.WV.e.EBO1 Describe sounds in terms of their properties. Key concepts: Properties: pitch—	IV.4.e.1 Describe sounds in terms of their properties. Key concepts: Properties: pitch—high, low. Loudness—loud, soft. Real-world contexts: Sound from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices. S.FI.P.WV.e.EB01 Describe sounds in terms of their properties. Key concepts: Properties: pitch—high, low; loudness—loud, soft. Real-world contexts: Sounds traveling through gases, such as human hearing, sonic booms. S.FI.P.WV.m.EB01 Recognize how sounds travel through different media. Key concepts: Media—solids, such as human hearing, sonic booms. S.FI.P.WV.m.EB01 Recognize how sounds travel through different media. Key concepts: Media—solids, liquids, gases. Key concepts: Media—solids, liquids, gases. Key concepts: Media—solids, liquids, gases. Real-world contexts: Sounds travel through different media. Key concepts: Media—solids, liquids, gases. Key concepts: Media—solids, liquids, gases. Real-world contexts: Sounds travel through different media. Key concepts: Media—solids, such as human hearing, sonic booms.

Draft Supported	S.SI.P.WV.e.EB01	S.SI.P.WV.m.EB01	S.SI.P.WV.h.EB01
Independence	Identify and create sounds.	Compare properties of sound.	Identify vibration as the source of
Extended	Tability and or said countain	compare properties of sounds	sound.
Benchmark	Key concepts: Loud/soft,	Key concepts: Loud/soft,	33.13.
	high/low.	high/low.	Key concepts: Loud/soft,
Classroom/LEA/ISD	g	g.,	high/low, vibration.
and State	Real-world contexts: Leisure	Real-world contexts: Leisure	riigit, tott, violationi.
	activities (music—playing	activities (music—playing	Real-world contexts: Leisure
	instrument, clapping, snapping);	instrument, clapping, snapping);	activities (music—playing
	objects in environment (safety	objects in environment (safety	instrument, guitar, drumming,
	alarms, telephone); animals;	alarms, telephone); animals;	clapping, snapping); objects in
	communication.	communication.	environment (safety alarms,
			telephone); animals;
			communication (vocal cords).
Draft Participation	S.PA.P.WV.e.EB01	S.PA.P.WV.m.EB01	S.PA.P.WV.h.EB01
Extended	Identify different characteristics	Identify ways to create sound.	Identify sources of sound.
Benchmark	of sound.		
		Key concepts: Vibration, switch	Key concepts: Vibration,
Classroom/LEA/ISD	Key concepts: Vibration,	devices.	loud/soft, high/low.
and State	loud/soft, high/low.		
		Real-world contexts: Leisure	Real-world contexts: Water
	Real-world contexts: Leisure	activities (music—playing	running, fire siren, thunder,
	activities (music—playing	instrument, clapping, snapping);	animals, communication.
	instrument, clapping, snapping);	objects in environment—safety	
	objects in environment—safety	alarms, telephone;	
	alarms, telephone.	communication.	

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	Explain how sounds are made. Key concepts: Vibrations—fast, slow, large, small. Real-world contexts: Sounds from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices.	Explain how echoes occur and how they are used. Key concepts: Echo, sonar, reflection. Real-world contexts: Echoes in rooms—acoustics—and outdoors; practical uses of echoes, such as navigation by bats and dolphins, ultrasound imaging, sonar.	None
Draft Functional Independence Extended Benchmark Classroom/LEA/ISD and State	S.FI.P.WV.e.EBOE Explain how sounds are made. Key concepts: Vibrations—fast, slow, large, small. Real-world contexts: Sounds from common sources, such as musical instruments, radio, television, animal sounds, thunder, human voices; hobbies—music, television; weather; speech and communication.	S.FI.P.WV.m.EB01 Identify echoes and how they are used. Key concepts: Echo, sonar, reflection. Real-world contexts: Echoes in rooms—acoustics—and outdoors; practical uses of echoes, such as navigation by bats and dolphins, ultrasound imaging, sonar.	n/a
Draft Supported Independence Extended Benchmark Draft Participation Extended Benchmark			

All 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
All students will explain shadows, color, and other light phenomena:			
	Elementary School	Middle School	High School
Science Benchmark	IV.4.e.3	IV.4.m.3	IV.4.h.2
MCF v.2000	Use prisms and filters with light sources to produce various colors of light.	Explain how light is required to see objects.	Explain how we see colors of objects.
		Key concepts: Light source,	Key concepts: Characteristics of
	Key Concepts: White light is	object, eye as a detector,	light—brightness, amplitude,
	composed of different colors.	illumination, path of light, reflection, absorption. See PWV-	colors of spectrum (red, orange, yellow, green, blue, indigo, violet)
	Tools: Prisms, color filters, colored lights.	IV.4 m.2 (echo location).	wavelength, frequency (see PWV-IV.4 h.3). Ways that objects
	colored lights.	Real-world contexts: Seeing	interact with light—emission,
	Real-world contexts: Light from	common objects in our	reflection, absorption,
	common sources, such as sun,	environment; seeing "through"	transmission, scattering (see
	stars, light bulb, colored lights,	transparent media, such as	PWV-IV.4 m.4).
	firefly, candle, flashlight, various	windows, water; using flashlights	
	prisms.	to see in the dark.	Real-world contexts: Colored light-reflecting objects, such as
			books, clothes, color photographs; colored light-transmitting objects,
			such as stained glass, cellophane;
			colored light-emitting objects,
			such as television, neon lights. Scattering of light by the
			atmosphere.

Draft Functional	S.FI.P.WV.e.EB02	S.FI.P.WV.m.EB02	n/a
Independence	Use prisms and filters with light	Explain how light is required to	
Extended	sources to produce various colors	see objects.	
Benchmark	of light.		
		Key concepts: Light source,	
Classroom/LEA/ISD	Key concepts: White light is	object, eye as a detector,	
and State	composed of different colors.	illumination, path of light,	
		reflection, absorption.	
	Tools: Prisms, color filters,		
	colored lights.	Real-world contexts: Seeing	
		common objects in our	
	Real-world contexts: Light from	environment; seeing "through"	
	common sources, such as sun,	transparent media, such as	
	stars, light bulb, colored lights,	windows, water; using flashlight	
	firefly, candle, flashlight, various	to see in the dark; using	
	prisms.	flashlight with mirrors; light	<u> </u>
		source and different colors of	
		paper (absorption); glossy	
		medium and reflection of light;	
		clothing choice (light shirt/hot	
		day); safety practices.	
Draft Supported	S.SI.P.WV.e.EB02	S.SI.P.WV.m.EB02	n/a
Independence	Identify light sources.	Identify light sources.	
Extended	3 3	3 3	
Benchmark	Key concepts: Light source,	Key concepts: Light source,	
	shadows, colors.	shadows, colors.	
Classroom/LEA/ISD			
and State	Real-world contexts: Safety	Real-world contexts: Safety	
	issues; toys, flashlight, light fire,	issues; flashlight, light bulb, fire,	
	stars, colored paper, mirror.	sun, stars.	
Draft Participation	S.PA.P.WV.e.EB02	S.PA.P.WV.m.EB02	n/a
Extended	Identify light sources in common	Identify light sources in common	
Benchmark	activities.	activities.	
Classroom/LEA/ISD	Key concepts: Light sources.	Key concepts: Light sources.	
and State	1115 co.135pts. 2.gtt. 35d. 5551		
	Real-world contexts: Shade,	Real-world contexts: Shade,	
	sunglasses, hat, colored paper,	sunglasses, hat, toys, flashlight,	
	mirror, prism.	lamp.	
	Timi di pilolili	INT. P.	

	Elementary School	Middle School	High School
Science Benchmark	IV.4.e.4	IV.4.m.4	None
MCF v.2000	Explain how shadows are made.	Describe ways in which light interacts with matter.	
	Key concepts: Shadow, blocked		
	path, surface, object, light	Key concepts: Reflection,	
	moves outward from source in	refraction, absorption,	
	straight lines.	transmission, scattering,	
	Real-world contexts: Shadows	medium, lens. Transmission of light—transparent, translucent,	
	made on surfaces by putting	opaque.	
	objects in the path of light from	opaque.	
	common sources, including	Real-world contexts: Objects	
	sunlight, light bulbs, projectors.	that reflect or absorb light,	
	Changes in size of shadows due	including mirrors; media that	
	to distance from object.	transmit light such as clear and	
		frosted glass, clear and cloudy	
		water, clear and smoky air; objects that refract light,	
		including lenses, prisms, and	
		fiber optics; uses of lenses, such	
		as eye, cameras, telescope,	
		microscope, magnifying lens, for	
		magnification and light-	
I.		gathering.	

Draft Functional	S.FI.P.WV.e.EB03	S.FI.P.WV.m.EB03	S.FI.P.WV.h.EB02
Independence	Explain how shadows are made.	Identify applications of shadows	Describe ways in which light
Extended	'	in real-world contexts.	interacts with matter.
Benchmark	Key concepts: Shadow, blocked		
	path, surface, object, light	Key concepts: Shadow, blocked	Key concepts: Reflection,
Classroom/LEA/ISD	moves outward form source in	path, surface, object.	refraction, absorption, scattering,
and State	straight lines.	pating surrassy sugesti	medium, lens.
	an angua musa	Real-world contexts: Protection	
	Real-world contexts: Shadows	from sun and sunburns;	Real-world contexts: Objects that
	made on surfaces by putting	horticulture—plant shade trees	reflect or absorb light, including
	objects in the path of light from	covering sun's path for cooling.	mirrors; media that transmit light,
	common sources, including	and participation of the same participation	such as clear and frosted glass,
	sunlight, light bulb, projectors;		clear and cloudy water, clear and
	changes in size of shadows due		smoky air; objects that refract
	to distance form object.		light, including lenses, prisms,
	,		and fiber optics; uses of lenses,
			such as eye, cameras, telescope,
			microscope, magnifying lens, for
			magnification and light-gathering.
Draft Supported	S.SI.P.WV.e.EB03	S.SI.P.WV.m.EB03	S.SI.P.WV.h.EB02
Independence	Identify refection in common	Identify shadows and sources of	Use light and blockages to create
Extended	activities.	reflection.	shadows.
Benchmark			
	Key concepts: Reflection.	Key concepts: Reflection, shade,	Key concepts: Reflection, shade,
Classroom/LEA/ISD		shadow, protection from sun.	shadow, protection from sun.
	Real-world contexts: Exploring		
	with mirrors; hygiene (dressing,	Real-world contexts: Useful and	Real-world contexts: Useful and
	self care, checking appearance).	harmful reflections—protection	harmful reflections—protection
		from sun and sunburns; shade	from sun and sunburns; shade
		trees, hat, umbrella, sunglasses,	trees, hat, umbrella, sunglasses,
		blinds.	blinds.
			•

Draft Participation	S.PA.P.WV.e.EB03	S.PA.P.WV.m.EB03	S.PA.P.WV.h.EB03
Extended	Demonstrate an awareness of	Identify examples of reflections.	Identify examples of reflections.
Benchmark	reflections.		
		Key concepts: Mirrors.	Key concepts: Mirrors.
Classroom/LEA/ISD	Key concepts: Mirrors.		
		Real-world contexts: Exploring	Real-world contexts: Exploring
	Real-world contexts: Exploring	with mirrors; useful/harmful	with mirrors; useful/harmful
	with mirrors; hygiene (self care,	reflections—protection from sun	reflections—protection from sun
	dressing, checking appearance).	and sunburns; hygiene (self	and sunburns; hygiene (self care,
		care, dressing, checking	dressing, checking appearance).
		appearance).	▼

All students will measure and describe vibrations and waves:

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	IV.4.m.5 Describe the motion of vibrating objects. Key concepts: Period, frequency, amplitude. Real-world contexts: Vibrating or oscillating objects, such as weights on springs, vocal cords, tuning forks, guitar strings.	IV.4.h.3 Describe waves in terms of their properties. Key concepts: Mechanical waves, electromagnetic waves—see PWV-IV.4 h.4. Colors of light. Properties of waves—frequency, amplitude, wavelength, wave velocity, energy. Units of measurement—hertz or cycles per second, micrometers, meters, meters per second. Tools for making spectra: Prism, diffraction grating. Real-world contexts: Examples of mechanical and electromagnetic
			waves—see PWV-IV.4 h.4. Colors of light, frequencies of radio and
	~		TV transmission.

Draft Functional Independence Extended	n/a	n/a	S.FI.P.WV.h.EB03 Identify properties of waves.
Benchmark			Key concepts: Period, frequency,
Deficilitation			amplitude.
Classroom/LEA/ISD			
and State			Real-world contexts: Vibrating or
		,	oscillating objects, such as
			weights on springs, vocal cords,
			tuning forks, guitar strings.
Draft Supported			
Independence		· · · · · · · · · · · · · · · · · · ·	
Extended			
Benchmark			
Draft Participation			
Extended			
Benchmark			

	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	None	IV.4.h.4 Describe different types of waves and their technological applications. Key concepts: Types of waves—mechanical: sound, ultrasound, water waves, shock wave; electromagnetic: radio waves, microwaves, radiant heat, infrared radiation, visible light, ultraviolet radiation, x-rays. Properties of waves—see PWVIV.4 h.3. See PCM-IV.2 m.4 (energy transformations). Real-world contexts: Examples of mechanical waves—sound, ultrasound, ocean waves, wave tanks, earthquakes, seismic waves; examples of electromagnetic waves, such as light—see above, radio and television signals, heat lamps, microwave transmitters, radar, ultraviolet radiation in sunlight, X-ray machines, CAT-scans, gamma rays from radioactive decay.

	1	T	
Draft Functional	n/a	n/a	S.FI.P.WV.h.EB0F
Independence			Identify different types of waves.
Extended			
Benchmark			Key concepts: Types of waves—
			mechanical: sound, ultrasound,
Classroom/LEA/ISD			water waves, shock wave;
0.000.00, 22			electromagnetic: radio waves,
			microwaves, radiant heat, infrared
			radiation, visible light, ultraviolet
			radiation, x-rays. Properties of
			waves.
			waves.
			Real-world contexts: Examples of
			mechanical waves—sound,
			ultrasound, ocean waves, wave
			tanks, earthquakes, seismic
			waves; examples of
			electromagnetic waves, such as
			light—see above, radio and
			television signals, heat lamps,
			microwaves transmitters, radar,
			ultraviolet radiation in sunlight, x-
			ray machines, CAT-scans; medical
Due ft Commente d			technicians; current events.
Draft Supported			
Independence			
Extended			
Benchmark			
Draft Participation			
Extended			
Benchmark			

All students will explain how waves and vibrations transfer energy:			
	•		
	Elementary School	Middle School	High School
Science Benchmark MCF v.2000	None	IV.4.m.6 Explain how mechanical waves transfer energy. Key concepts: Sound energy, absorption, transmission, reflection; media—air, solids, water. (See PME-IV.1 m.6, electrical circuits transfer electrical energy.) Real-world contexts: Waves in slinkies and long springs, sound waves, water waves, earthquakes.	None
Draft Functional Independence Extended Benchmark			
Draft Supported Independence Extended Benchmark			
Draft Participation Extended Benchmark			